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<b>PETITION FEE</b> Under 37 CFR 1.17(f), (g) & (h) <b>TRANSMITTAL</b> (Fees are subject to annual revision)  Send completed form to: Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450	<b>Application Number</b>	<b>10/777,107</b>
	<b>Filing Date</b>	<b>February 13, 2004</b>
	<b>First Named Inventor</b>	<b>Y. EGUCHI</b>
	<b>Art Unit</b>	<b>2181</b>
	<b>Examiner Name</b>	<b>Unassigned</b>
	<b>Attorney Docket Number</b>	<b>NIT-411</b>

Enclosed is a petition filed under 37 CFR 1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)).  
Payment of \$ 130.00 is enclosed.

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.

**Payment of Fees** (small entity amounts are NOT available for the petition (fees))

☒ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 50-1417:  
☐ petition fee under 37 CFR 1.17(f), (g) or (h) ☒ any deficiency of fees and credit of any overpayments  
Enclose a duplicative copy of this form for fee processing.

☐ Check in the amount of \$ \_\_\_\_\_ is enclosed.

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<b>Petition Fees under 37 CFR 1.17(f):</b>	<b>Fee \$400</b>	<b>Fee Code 1462</b>
For petitions filed under: § 1.53(e) - to accord a filing date. § 1.57(a) - to according a filing date. § 1.182 - for decision on a question not specifically provided for. § 1.183 - to suspend the rules. § 1.378(e) for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent. § 1.741(b) - to accord a filing date to an application under §1.740 for extension of a patent term.		

<b>Petition Fees under 37 CFR 1.17(g):</b>	<b>Fee \$200</b>	<b>Fee code 1463</b>
For petitions filed under: §1.12 - for access to an assignment record. §1.14 - for access to an application. §1.47 - for filing by other than all the inventors or a person not the inventor. §1.59 - for expungement of information. §1.103(a) - to suspend action in an application. §1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available. §1.295 - for review of refusal to publish a statutory invention registration. §1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued. §1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent. §1.550(c) - for patent owner requests for extension of time in <u>ex parte</u> reexamination proceedings. §1.956 - for patent owner requests for extension of time in <u>inter partes</u> reexamination proceedings. § 5.12 - for expedited handling of a foreign filing license. § 5.15 - for changing the scope of a license. § 5.25 - for retroactive license.		

<b>Petition Fees under 37 CFR 1.17(h):</b>	<b>Fee \$130</b>	<b>Fee Code 1464</b>
For petitions filed under: §1.19(g) - to request documents in a form other than that provided in this part. §1.84 - for accepting color drawings or photographs. §1.91 - for entry of a model or exhibit. §1.102(d) - to make an application special. §1.138(c) - to expressly abandon an application to avoid publication. §1.313 - to withdraw an application from issue. §1.314 - to defer issuance of a patent.		

<b>Name (Print/Type)</b>	<b>Colin D. Barnitz</b>	<b>Registration No. (Attorney/Agent)</b>	<b>35,061</b>
<b>Signature</b>		<b>Date</b>	<b>February 3, 2005</b>

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**Appl. No. 10/777,107**

Confirmation No. 4558

Inventor: EGUCHI, Y. et al.

Filed: February 13, 2004

Title: STORAGE SUBSYSTEM

Group Art Unit: 2181

Examiner: Unassigned

Attorney Docket No.: NIT-411

Customer No. 24956

**PETITION TO MAKE SPECIAL  
UNDER 37 CFR §1.102(d) (MPEP §708.02(VIII))**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The Applicants petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). In support of this Petition, pursuant to MPEP § 708.02(VIII), Applicants state the following.

**(A) REQUIRED FEE**

This Petition is accompanied by the fee set forth in 37 CFR § 1.117(h). A Credit Card Payment Form in the amount of \$130 accompanies this Petition in satisfaction of the fee. The Commissioner is hereby authorized to charge any

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additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

**(B) ALL CLAIMS DIRECTED TO A SINGLE INVENTION**

All the pending claims of the application, claims 1-20, are directed to a single invention. If the Office determines that all claims in the application are not directed to a single invention, Applicant will make election without traverse as a prerequisite to the grant of special status.

The present invention, as set forth in independent claim 1, includes a storage subsystem including a first storage system and a second storage system, each of which is connected to a host via a communication channel, in which the second storage system stores a copy of data to be transmitted from the first storage system. Claim 1 is directed to a data restoring method for restoring data stored in the second storage system. The first storage system processes an I/O request from the host, and as a result of I/O processing of the second storage system, transmits updated data. The second storage system retains data received from the first storage system as update log data. The host transmits a command for settling a state of an application to the first storage system as data. The first storage system transmits the data to the second storage system. The host and the second storage system both retain an identifier corresponding to the command, and relate the identifier to the log data, whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system.

Under a further aspect, as set forth in independent claim 7, the invention is directed to a data processing method for processing data to be stored in a storage unit in a computer system including a storage system equipped with the storage unit connected to a host through a network, wherein the host requests the storage system to create and save a copy of data which has been stored in the storage unit. The host further requests the storage system to record an update portion of data due to processing of the host. The host also transmits to the storage system identification information for identifying a state of the computer system at any given time. The storage system creates and saves a copy of data of the storage unit in response to a request of the host, and saves as log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update. The storage system retains identification information to be transmitted from the host, and relates the log data to the identification information.

The invention is also directed to, as set forth in independent claims 12, 18, and 20, a storage subsystem and storage system including a first storage system and a second storage system. A copy of data to be stored in the first storage system is stored in a second storage system. The storage system has a plurality of logical storage units, of which a certain logical storage unit of the second storage system stores a copy of data to be stored in a logical storage unit of the first storage system, constituting a pair. Another logical storage unit includes: a storage unit to be allocated in order to store log data generated by the first storage system; a cache

memory for temporarily storing data to be inputted into or outputted from the storage unit; a memory for storing at least management information concerning the logical storage unit, management information for defining a configuration of pair duplex between the first storage system and the second storage system, management information of a log, and a program for processing a command from the host; and a processor for executing the program. When content of a certain logical storage unit of the first storage system has been updated, the data thus updated and information indicating a place of update are transmitted to the second storage system as log data and stored in the logical storage unit of the second storage system, and management information for bringing identification information transmitted from the host into correspondence with the log data is stored in the memory.

### **(C) PRE-EXAMINATION SEARCH**

A careful and thorough pre-examination search has been conducted, directed to the invention as claimed. The pre-examination search was conducted in the in the following *US Manual of Classification* subclasses:

<b><u>Class</u></b>	<b><u>Subclass</u></b>
707	202, 204
711	114, 162
714	6, 20

Furthermore, a keyword search was conducted on the USPTO's EAST database. Additionally, a literature search was also conducted for relevant non-patent documents using DIALOG online databases. In addition, a search for foreign patent documents was conducted on the ESPACENET databases.

**(D) DOCUMENTS DEVELOPED BY THE PRE-EXAMINATION SEARCH**

Of the documents reviewed during the search, those deemed to be most closely related to the subject matter encompassed by the claims are listed below. These documents were made of record in the present application by the Information Disclosure Statement filed December 15, 2004.

<b><u>Document No.</u></b>	<b><u>Inventor</u></b>
US 6044444	Ofek, Yuval
US 6393537	Kern, Robert F. et al.
US 6397229	Menon, Jaishankar M. et al.
US 6606694	Carteau, Daniel
US 6671705	Duprey, Dennis et al.
US 6732123	Moore, David Wayne et al.
US 6789178	Mikkelsen, Claus W. et al.
US 20030145179	Gabber, Eran et al.

Additionally, the following documents were made of record in the present application by the Information Disclosure Statement filed February 13, 2004.

<b><u>Document No.</u></b>	<b><u>Inventor</u></b>
US 5263154	Eastridge, Lawrence E. et al.
US 5544347	Yanai, Moshe et al.
US 5742792	Yanai, Moshe et al.
JP2001-216185	Watanabe, Haruaki et al.

Because all of the above-listed documents are already of record in the present application, in accordance with MPEP § 708.02(VIII)(D), additional copies of these documents have not been submitted with this Petition.

### **(E) DETAILED DISCUSSION OF THE REFERENCES**

A discussion of each the above-listed documents is set forth below, pointing out, with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed subject matter is patentable over the teachings of the above-listed documents.

US Patent No. 6044444, to Ofek, discloses two data storage systems interconnected for remote mirroring of data. A number of automatic and non-automatic recovery mechanisms are provided. One option, when performing automatic recovery, is to log multiple versions of tracks containing remote pending data. Other recovery methods include a scheme in which an application program maintains a log file of all writes. To ensure recovery, the application program always writes data to a primary copy of the log file before it is written to a primary copy of the data file. The degree of synchronization between the secondary copies and the primary copies is maintained so that the remote mirroring facility always writes data to the secondary copy of the log file prior to writing data to the secondary copy of the data file. Ofek also includes a log-in-cache mode in which multiple versions of write data can be stored in cache in order to recover from a rolling disaster. (See, e.g., column 4, lines 15-22 and lines 35-52, and Abstract.) Thus, while Ofek teaches the storage of log data, Ofek does not teach the present invention, in which a certain logical storage unit in a second storage system that stores a copy of data to be stored in a logical storage unit of a first storage system constituting a pair, and another logical storage unit, where the other logical storage unit includes a storage

unit to be allocated in order to store log data generated by the first storage system; a cache memory for temporarily storing data to be inputted into or outputted from the storage unit; a memory for storing at least management information concerning the logical storage unit; management information for defining a configuration of a pair duplex between the first storage system and the second storage system; management information of a log and a program for processing a command from the host; and a processor for executing the program, as set forth in independent claims 12, 18, and 20. Nor does Ofek teach a host transmitting a command for settling a state of an application to a first storage system as data, the first storage system transmitting the data to a second storage system, and the host and the second storage system both retaining an identifier corresponding to the command, and relating the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1 of the present application. Similarly, with respect to claim 7, Ofek does not teach a data processing method in which a host transmits to a storage system identification information for identifying a state of the computer system at any given time, and the storage system creates and saves a copy of data of the storage unit in response to a request of the host, and saves as log data, when content of the storage unit has been updated, data prior to and subsequent to the update, and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log data to



the identification information. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Ofek.

US Patent No. 6393537, to Kern et al., discloses an outboard data management device that manages the movement of data to and from various data storage devices, while only sending data to the host processor if necessary. Thus, the primary processor is free to perform other tasks. (See, e.g., column 5, line 60 – column 6, line 36.) However, Kern does not teach a second storage system that includes a plurality of logical storage units, wherein one logical storage unit stores a copy of a logical storage unit in a first storage system, and another logical storage unit includes a storage unit allocated to store log data generated by the first storage system, as set forth in claims 12, 18, and 20. Nor does Kern teach a host transmitting a command for settling a state of an application to a first storage system as data, with the first storage system transmitting the data to a second storage system, and the host and the second storage system both retaining an identifier corresponding to the command, and relating the identifier to log data, whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1 of the present application. Additionally, Kern does not teach a data processing method of claim 7 in which a host transmits to a storage system identification information for identifying a state of the computer system at any given time, and the storage system creates and saves a copy of data of the storage unit in response to a request of the host, and saves as

log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log data to the identification information. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Kern.

US Patent No. 6397229, to Menon et al., discloses a system having outboard storage-controller-managed incremental backup/restore of data. A value of an indicator residing in the memory of a storage controller is set when the associated portion of the data has changed. The associated portion of the data stored in the data storage device is backed up using the storage controller when the value of the indicator residing in the memory is set. The value of the indicator is cleared once the associated data has been backed up. Thus, the overhead on the host computer is reduced. (See, e.g., column 1, line 63 – column 2, line 15.) Accordingly, Menon does not teach the present invention, and does not include a second storage system that includes a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit, where the other logical storage unit includes a storage unit to be allocated in order to store log data generated by the first storage system, as set forth in claims 12, 18, and 20. Furthermore, Menon does not teach a host transmitting a command for settling a state of an application to a first storage system as data, with the first storage system transmitting the data to a

second storage system, and the host and the second storage system both retaining an identifier corresponding to the command, and relating the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1 of the present application. Additionally, Menon does not teach the data processing method of claim 7, in which a host transmits to a storage system identification information for identifying a state of the computer system at any given time, and the storage system creates and saves a copy of data of the storage unit in response to a request of the host, and saves as log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log data to the identification information. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Menon.

US Patent No. 6606694, to Carteau, discloses a system in which disk drives are mirrored through duplication controlled by disk controllers. Each disk controller controls writing to a set of disk drives. The first controller logs writes to a second controller in a log file to enable resynchronization after mirroring is broken and reestablished. (See, e.g., column 4, lines 28-40.) However, Carteau fails to teach a second storage system that includes a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit, where

the other logical storage unit includes a storage unit to be allocated in order to store log data generated by the first storage system, as set forth in claims 12, 18, and 20. Furthermore, Carteau does not teach data restoring method including a host transmitting a command for settling a state of an application to a first storage system as data, with the first storage system transmitting the data to a second storage system, and the host and the second storage system both retaining an identifier corresponding to the command, and relating the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1 of the present application. Additionally, Carteau does not teach the data processing method of claim 7, in which a host transmits to a storage system identification information for identifying a state of the computer system at any given time, and the storage system creates and saves a copy of data of the storage unit in response to a request of the host, and saves as log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log data to the identification information. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Carteau.

US Patent No. 6671705, to Duprey et al., discloses a remote mirroring system in which a master storage unit uses a log to resynchronize slave images following a fail in the master storage unit. The log is preserved through the failure and is

available to the master storage unit upon recovery from the failure. (See, e.g., column 2, line 66 – column 3, line 19.) Thus, Duprey does not teach the present invention, and does not include a second storage system that includes a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit, where the other logical storage unit includes a storage unit to be allocated in order to store log data generated by the first storage system, as set forth in claims 12, 18, and 20. Additionally, Duprey does not teach a data restoring method in which a host and a second storage system both retain an identifier corresponding to a command, and relate the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1. Nor does Duprey teach a data processing method that includes saving as log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log data to the identification information, as set forth in claim 7. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Duprey.

US Patent No. 6732123, to Moore et al., discloses a method and apparatus for merging of log data for recovering one or more database data sets in a single pass of the respective log data. This eliminates the need for change accumulation,

and the need to run separate recovery jobs for each data set requiring recovery. Recovery may be in accordance with a supplied time-stamp by means of point-in-time recovery. (See, e.g., column 7, line 7 – column 8, line 53.) However, Moore does not teach a second storage system that includes a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit, where the other logical storage unit includes a storage unit to be allocated in order to store log data generated by the first storage system, as set forth in claims 12, 18, and 20 of the present application. Nor does Moore teach a data restoring method in which a host and a second storage system both retain an identifier corresponding to a command, and relate the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1. Additionally, Moore does not teach a data processing method that includes saving as log data, when content of a storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that a storage system retains identification information to be transmitted from a host, and relates the log data to the identification information, as set forth in claim 7. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Moore.

US Patent No. 6789178, to Mikkelsen et al., discloses a system in which, when a remote copy is suspended, a primary controller stops sending update

information to the secondary controller, and begins storing indicators of the updated information in cache memory. When the primary controller resumes remote copy operation, it uses the cached indicators to identify update information the must be sent to the secondary controller to resynchronize remote copy. (See, e.g., Abstract.) Thus, Mikkelsen does not teach a second storage system that includes a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit, where the other logical storage unit includes a storage unit to be allocated in order to store log data generated by the first storage system, as set forth in claims 12, 18, and 20. Also, Mikkelsen doe not teach a data restoring method in which a host and a second storage system both retain an identifier corresponding to a command, and relate the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1. Nor does Mikkelsen teach a data processing method that includes saving as log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log data to the identification information, as set forth in claim 7. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Mikkelsen.

Published US Patent Application No. US20030145179, to Gabber et al., discloses a method and apparatus for replicated storage in which recovery is effected directly between respective storage elements and associated storage devices without transmitting the data through a host. The host assigns consecutive sequence numbers to consecutive write requests. The storage element and its associated storage device are determined not to have up-to-date data when it fails to receive one or more recent write requests, or when a gap is detected in sequence numbers. (See, e.g., paragraphs [0007]-[0008].) Thus, Gabber does not teach the present invention, and does not include a second storage system that includes a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of a first storage system constituting a pair, and another logical storage unit, where the other logical storage unit includes a storage unit to be allocated in order to store log data generated by the first storage system, as set forth in claims 12, 18, and 20. Nor does Gabber teach a data restoring method in which a host and a second storage system both retain an identifier corresponding to a command, and relate the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1. Additionally, Gabber does not teach a data processing method that includes saving as log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log



data to the identification information, as set forth in claim 7. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Gabber.

US Patent No. 5263154, to Eastridge et al., shows a conventional technique concerning backup and restoration, in which data stored in the storage system at a point of time designated by the user is reproduced on a magnetic tape without stopping input and output of data from a host connected to the storage system, and through the use of the data thus reproduced, the data is recovered. In the restoration processing described in Eastridge, when reading out backup data from a magnetic tape, a portion which has not been updated from a point of time when the backup data has been acquired, is also read out from the magnetic tape, and is written into the storage system. (See, e.g., Abstract and column 3, lines 23-45.) Thus Eastridge does not teach a number of features of the present invention, such as a second storage system that includes a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of a first storage system constituting a pair, and another logical storage unit, where the other logical storage unit includes a storage unit to be allocated in order to store log data generated by the first storage system, as set forth in claims 12, 18, and 20. Nor does Eastridge teach a data restoring method in which a host and a second storage system both retain an identifier corresponding to a command, and relate the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set

forth in claim 1. Additionally, Eastridge does not teach a data processing method that includes saving as log data, when content of the storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that the storage system retains identification information to be transmitted from the host, and relates the log data to the identification information, as set forth in claim 7. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Eastridge.

US Patent Nos. 5544347 and 5742792, to Yanai et al., disclose a technique for copying data by a remote storage system independently of the host. Under Yanai, data written by a host to a primary volume is automatically sent over a link to corresponding secondary volume. When remote mirroring fails, the secondary copy of the data can be recovered using changes recorded in the secondary copy of the log file. (See, e.g., Abstract and column 4, line 64, through column 5, line 15 of the '792 patent.) However, Yanai does not teach a storage subsystem in which, when content of a certain logical storage unit of a first storage system has been updated, the data thus updated and information indicating a place of update are transmitted to a second storage system as log data and stored in a logical storage unit of the second storage system, and management information for bringing identification information transmitted from the host into correspondence with the log data is stored in a memory in the second storage system, as set forth in claims 12, 18, and 20. Additionally, Yanai does not teach a data restoring method in which a host and a second storage system both retain an identifier corresponding to a command, and

relate the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1. Furthermore, Yanai does not teach a data processing method that includes saving as log data, when content of a storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that a storage system retains identification information to be transmitted from the host, and relates the log data to the identification information, as set forth in claim 7. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Yanai.

JP2001-216185 (equivalent to US6658434), to Watanabe et al., teaches a system and method for recovering data in which information regarding a place where the data has been updated is retained as difference information after backup of the data is carried out, and when data stored in the storage system is restored with the backup data, only a portion of the backup data shown by the difference information is used to restore the data. As regards data which has been updated during a period of time from a time at which backup of data is carried out to a time at which the storage system develops a failure, however, the data cannot be restored. When an attempt is made to restore data which has been updated after backup of data is carried out, it is necessary for the host side to manage the content of update of the data, by a log or the like, thus placing a load on the host. (See, e.g., Abstract and column 2, lines 1-33 of the '434 patent.) Thus, Watanabe does not teach the present invention, in which when content of a certain logical storage unit of a first storage system has

been updated, the data thus updated and information indicating a place of update are transmitted to a second storage system as log data and stored in a logical storage unit of the second storage system, and management information for bringing identification information transmitted from the host into correspondence with the log data is stored in a memory in the second storage system, as set forth in claims 12, 18, and 20. Additionally, Watanabe does not teach a data restoring method in which a host and a second storage system both retain an identifier corresponding to a command, and relate the identifier to log data whereby the host designates the identifier at any given time to thereby restore data at any given time by the second storage system, as set forth in claim 1. Furthermore, Watanabe does not teach a data processing method that includes saving as log data, when content of a storage unit has been updated, data prior to and subsequent to the update and information indicating a place of update, so that a storage system retains identification information to be transmitted from the host, and relates the log data to the identification information, as set forth in claim 7. Accordingly, claims 1, 7, 12, 18, and 20 are patentable over Watanabe.

## **CONCLUSION**

The Applicants submit that the foregoing discussion demonstrates the patentability independent claims 1, 7, 12, 18, and 20, over the closest-known prior art, taken either singly, or in combination. Accordingly, the requirements of 37 CFR §1.102(d) having been satisfied, the Applicants request that this Petition to Make Special be granted and that the application be examined according to prescribed procedures set forth in MPEP §708.02 (VIII).

The Applicants prepared this Petition in order to satisfy the requirements of 37 C.F.R. §1.102(d) and MPEP §708.02 (VIII). The pre-examination search required by these sections was "directed to the invention as claimed in the application for which special status is requested." MPEP §708.02 (VIII). The search performed in support of this Petition is believed to be in full compliance with the requirements of MPEP §708.02 (VIII); however, Applicants make no representation that the search covered every conceivable search area that might contain relevant prior art. It is always possible that prior art of greater relevance to the claims may exist. The Applicants urge the Examiner to conduct his or her own complete search of the prior art, and to thoroughly examine this application in view of the prior art cited above and any other prior art that may be located by the Examiner's independent search.

Further, while the Applicants have identified and discussed certain portions of each cited reference in order to satisfy the requirement for a "detailed discussion of the references, which discussion points out, with the particularity required by 37 C.F.R. §1.111(b) and (c), how the claimed subject matter is patentable over the

references" (MPEP §708.02(VIII)), the Examiner should not limit review of these documents to the identified portions, but rather is urged to review and consider the entirety of each reference.

Respectfully submitted,



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